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GOT WORMS?: Planning and Evaluation of a Culturally Appropriate Health Education Pilot Program for the Control of Soil-Transmitted Helminth Infections in Rwandan Village Children

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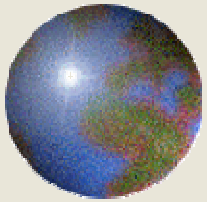

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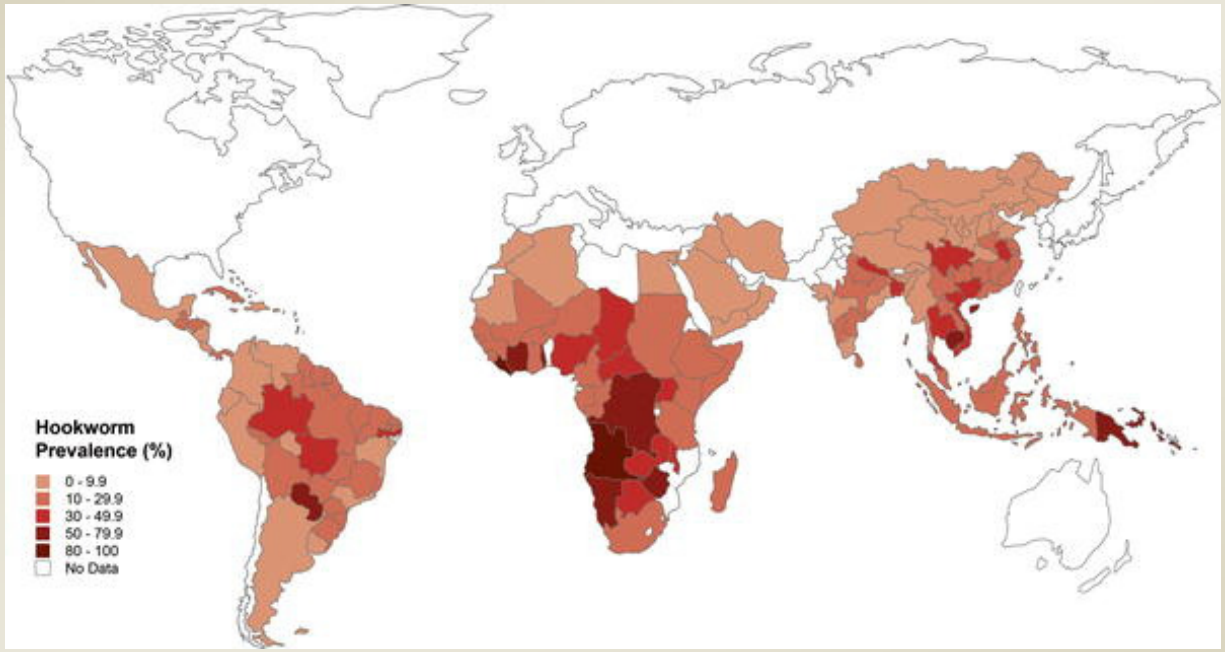
Global Health

- Neglected Tropical Diseases (NTDs)
  - 13 types of bacterial and parasitic infections
  - Affect poor people in Africa, South America and Asia
  - Prevalence is 1.4 billion people
  - Low mortality
  - High morbidity

Soil-transmitted Helminthes (STH)

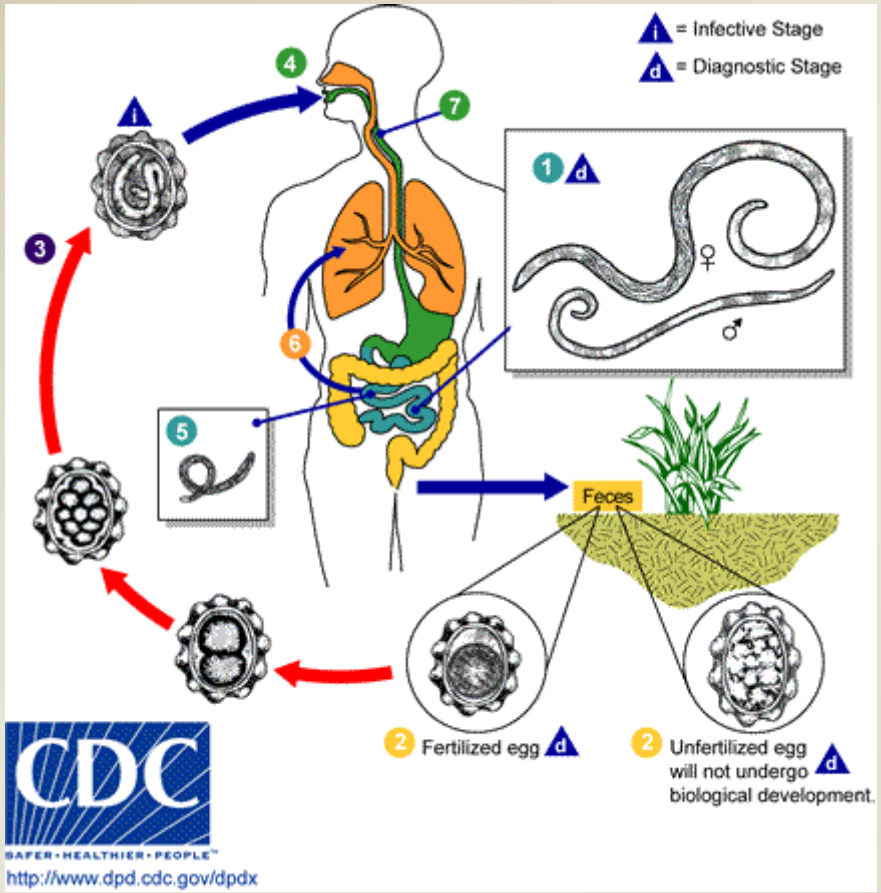
- Parasitic worms colonize the intestines
- Three types of STH Infections
  - Ascariasis: roundworm (*Ascaris lumbricoides*)
  - Trichuriasis: whipworm (*Trichuris trichiura*)
  - Hookworm infection: hookworm (*Ancylostoma duodenale* and *Necator americanus*)

STH Epidemiology



- Incidence of STH infections
  - Roundworm: 1.2 billion new cases per year
  - Whipworm: 800 million new cases per year
  - Hookworm: 700 million new cases per year

STH Transmission



- Fecal-to-oral transmission of eggs (roundworm & whipworm)
  - Consumption of trace amounts of contaminated soil
- Penetration of skin by larvae (hookworm)
  - Exposed skin contact with contaminated soil
- More common among children
  - Hand-to-mouth behaviors

STH Symptoms and Morbidity

- Low intensity infections
  - Relatively harmless
- High intensity infections
  - Malnutrition
  - Anemia
- Chronic, high intensity infections cause long-term morbidity in children
  - Cognitive developmental problems and learning disabilities
  - Stunted physical growth and wasting
  - Fatigue

STH Prevention

- Hygiene and Sanitation
  - Hand washing
  - Bathroom habits
  - Wearing shoes
  - Food preparation
  - Water treatment
  - Latrine maintenance
  - Farming practices

STH Treatment

- Anthelminthic “deworming” drugs
  - Cheap
  - Safe
  - Effective
  - Easily administered
  - Chemoprophylactic
- WHO Guidelines for Mass Drug Administration (MDA)
  - Once per year for 20-50% pediatric prevalence
  - Twice per year for 50%+ pediatric prevalence

Epidemiological Assessment

Conducted by The Access Project in 2007

- Prevalence of STH infections in Rwanda
  - 66% of all 10- to 16-year-olds
  - 70%+ in 15 of the country's 30 districts
  - Simultaneous infection with multiple types of STH common
- UNICEF 2003-2008 findings
  - 51% Rwandan children had stunted growth
  - 18% of under 5-year-olds severely underweight

Community Assessment

Conducted by Priscilla Sepe and JeffHEALTH in 2009

- "Knowledge, attitudes and practices related to soil-transmitted helminthes in Rwandan villages"
  - Misconceptions about transmission
  - Limited knowledge of long-term morbidity
  - Willingness to take deworming drugs
  - Limited water poses barrier to prevention
  - Poor sense of self-efficacy

- Recommendations for interventions
  - Small group seminar lessons
  - Educate mothers and/or children
  - Visual aids

STH Control in Rwanda

The Access Project in collaboration with Rwanda Ministry of Health

- Mass drug administration (MDA) in Rwanda
  - Ongoing: 2008-present, twice per year
  - Administration via health center and health workers
  - Successful
- MDA in Rwanda is cost-effective
  - $0.12 per child treated averts $4.22 per anemia case
- Sensitization campaign in Rwanda
  - Implemented: 2008-2009
  - Health education in schools and health centers
  - Unsuccessful

Goals and Objectives

- Goal 1: Plan and implement culturally appropriate health education pilot program based on findings of Sepe 2009
  - Objective 1: Increase knowledge of STH infections and transmission
  - Objective 2: Improve attitudes toward prevention and treatment
  - Objective 3: Support changes in health behaviors relevant to transmission

Goals and Objectives

- Goal 2: Evaluate pilot health education program
  - Objective 1: Improve planning and implementation of future health education programs in Rwanda
  - Objective 2: Determine effectiveness of community-based approach to program planning and evaluation

Materials and Methods

- Inclusion criteria and rationale
  - Women only
  - Have children or take care of children
- Subject recruitment
  - Convenience sample
- Format
  - Small group seminars
    - 3 lessons in each village
    - 9-12 subjects per lesson
  - Oral with visual aids
  - Traditional storyline/drama teaching method
- Content
  - Tailored to Rwandan village population
    - Knowledge
    - Attitudes
    - Practices

Materials and Methods

- Health Belief Model
  - Perceived susceptibility
  - Perceived severity
  - Perceived benefits
  - Perceive barriers
- Questionnaire
  - Pre- and post-lesson
  - One-on-one
  - Kinyarwanda translation
  - 17 questions
    - 2 demographics questions
    - 4 Yes/no answer questions
    - 11 Multiple-choice questions

Results

- Sample size and demographics
  - Number of Participants: 61
  - Number of Participants from Akarambi Village: 32
  - Number of Participants from Rugerero Village: 29
  - Percent Female: 100%
  - Age Range: 17 to 60 years
  - Average Age: 34.6 years
  - Number of Children: 0 to 8
  - Average Number of Children: 3.1

Results

- Perceived susceptibility & knowledge of transmission
  - Who in your village can have infection with inzoka? (Question 4)
    - Before: 90% Correct
    - After: 100% Correct
    - Percent Change: 11%
    - Chi-square (1, N=62) = 10.53, p = .001
  - Why do people become infected with inzoka? (Question 5)
    - Before: 92% Correct
    - After: 100% Correct
    - Percent Change: 8.7%
    - Chi-square (1, N=62) = 8.33, p = .004

Results

- Perceived severity & knowledge of symptoms and morbidity
  - Do people who have inzoka have symptoms? (Question 7)
    - Before: 3% Correct
    - After: 15% Correct
    - Percent Change: 400%
    - Chi-square (1, N=62) = 8.79, p = .003
  - Common symptoms of inzoka in children are? (Question 8)
    - Before: 100% Correct
    - After: 100% Correct
  - Repeated infections with inzoka in children can cause? (Question 9)
    - Before: 44% Correct
    - After: 62% Correct
    - Percent Change: 41%
    - Chi-square (1, N=62) = 6.50, p = .01

Results

- Knowledge of prevention
  - How can you prevent worm infection at home? (Question 11)
    - Before: 92% Correct
    - After: 97% Correct
    - Percent Change: 5.4%
    - Chi-square (1, N=62) = 2.41, p = .1
  - When is it most important for you and your children to wash your hands? (Question 12)
    - Before: 74% Correct
    - After: 87% Correct
    - Percent Change: 18%
    - Chi-square (1, N=62) = 5.38, p = .02

Results

- Perceived barriers and knowledge of treatment
  - Is there medication available to treat inzoka? (Question 13)
    - Before: 100% Yes
  - If yes (to Q13), is the medication to treat inzoka safe for your children to take? (Question 14)
    - Before: 100% Yes
  - At what age can you start giving a child medication for inzoka? (Question 15)
    - Before: 24% Correct
    - After: 81% Correct
    - Perfect Change: 240%
    - Chi-square (1, N=62) = 65.14, p = 0

Results

- Perceived benefits and intention to seek treatment
  - When should children take medication to treat inzoka? (Question 16)
    - Before: 90% Correct
    - After: 98% Correct
    - Perfect Change: 8.9%
    - Chi-square (1, N=62) = 5.67, p = .02
  - What should you do if you think that you or your child has inzoka? (Question 18)
    - Before: 100% Correct
    - After: 100% Correct

Results

- Knowledge of prior treatment
  - To your knowledge, has your child been given medication for inzoka in the past? (Question 17)
  - Before: 93% Yes
- Self-efficacy
  - Do you think it is possible to keep from getting inzoka? (Question 10)
  - Before: 98% Yes

Conclusions

- Lesson content
  - Good knowledge of transmission and high perceived severity
  - Very limited knowledge of long-term morbidity and low perceived severity
  - Good knowledge of treatment
  - Sufficient perceived benefit to treatment
  - Few perceived barriers to treatment
  - Self-efficacy and perceived barriers to prevention unclear
- Teaching methods
  - Visual aids effective
  - Traditional Rwanda teaching methods very effective
  - Quantitative information easily understood

Recommendations for Future JeffHEALTH Interventions

- Utilize traditional Rwandan teaching method of drama
- Develop culturally appropriate visual aids
- Give hands-on instruction in preventive health behaviors
- Use other health behavior theories
- Teach older children who take care of younger children
- Recruit and train village “STH experts”
- Work with villagers to improve sanitation

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